



Courtesy Annette Tagawa

## Freshwater Invertebrates

### Hīhīwai and Hapawai

*Neritina granosa*

*Neritina vespertina*

#### SPECIES STATUS:

IUCN Red List - Not considered

Endemic

**SPECIES INFORMATION:** These fresh and brackish water snails grow to about four centimeters (two inches) in length. Hīhīwai (*N. granosa*) are more active and more visible at night. Both species graze on algae growing on hard substrates. Eggs are deposited in capsules about two millimeters (one-tenth of an inch) long that are attached to rocks or other shells. Each capsule has about 250 eggs. Most egg-laying occurs from June through August. After hatching, the larvae wash into the ocean where they develop planktonically. Hīhīwai larvae develop in the ocean for up to a year before moving back into freshwater or estuaries to live out their lives. The young snails can be seen moving upstream in summer in single file along the rocks when they are about two to three millimeters (one-tenth of an inch) in size. Hapawai (*N. vespertina*) have only a few months developing in the ocean before they recruit to estuaries and ponds, and rarely to streams. Recruitment peaks shortly after rains. Hīhīwai may serve as good indicator species for stream quality. Hīhīwai shells from low elevations differ in shape from those at higher elevations and flows.

**DISTRIBUTION:** Historically, they were found on all the main islands. Currently, hapawai can still be found on all the main islands in disturbed and undisturbed streams, but hīhīwai are only common in high quality streams and are rare on O‘ahu.

**ABUNDANCE:** Their abundance is lower than it was historically in all but the most remote streams.

**LOCATION AND CONDITION OF KEY HABITAT:** Hīhīwai occur more in well-oxygenated lower to middle reaches of streams. They prefer streams with boulders and coarse gravel substrates. Hapawai occur in the lower reaches of streams and extend more into the estuary.

#### THREATS:

- Both species have been used by Hawaiians as a food source, though hīhīwai are preferred;
- Stream channelization and burial, pollution, and water diversions have affected the distribution and abundance of these snails. In particular, hīhīwai are limited in their upstream migration by low stream flows and in-stream obstructions.

**CONSERVATION ACTIONS:** In addition to common statewide and island conservation actions, specific actions include:

- Work to clean streams with significant pollution;
- Improve altered or diverted streams;
  - Modify or remove gratings or diversions to allow for instream passage;
  - Restore riparian vegetation to help decrease instream heating and reduce sediment loads;
  - Create pools in frequently dewatered stretches to provide safe usable habitat between flows.
- Continue developing GIS database and making it web-accessible;
- Maintain healthy populations with appropriate fishing regulations and education;
- Collaborate with the Commission on Water Resources Management and the Land Board to ensure adequate Instream Flow and biological integrity of riparian areas;
- Continue on-going partnerships focused on environmental education and conservation and expand partnerships;
- Restore habitat.

**MONITORING:**

- Establish survey schedule to determine population size and distribution.

**RESEARCH PRIORITIES:**

- Improve understanding of the life history of these snails and the factors that limit their abundance and distribution.

**References:**

Hau, Skippy. Hawai'i Division of Aquatic Resources. Personal communication.

Yamamoto M, Tagawa A. 2000. Hawaii's native and exotic freshwater animals. Honolulu, HI: Mutual Publishing. 200 pp.